1.   (currently amended) A <u>path-manager-implemented</u> method, comprising:

the path manager receiving one or more demands for service in a mesh network, which network comprises a plurality of nodes interconnected by a plurality of links; and

the path manager mapping each of the one or more demands onto a primary path and a restoration path in the network to generate at least one path plan for the one or more demands in the network, wherein the at least one path plan is generated as a function of (i) one or more cost criteria associated with the at least one path plan and (ii) a failure-related cross-connection criterion associated with the path plan by:

(a)   calculating a set of node-disjoint path pairs for the one or more demands based on the failure-related cross-connection criterion, wherein a node-disjoint path pair is calculated for each demand;

(b)   identifying primary and restoration paths for each node-disjoint path pair in the set to generate a path plan for the one or more demands;

(c)   determining whether the path plan satisfies the failure-related cross-connection criterion;

(d)   saving, when the path plan satisfies the failure-related cross-connection criterion, the path plan;

(e)   repeating steps (a)-(d) to generate two or more path plans that satisfy the failure-related cross-connection criterion; and

(f)   selecting one of the path plans based on the one or more cost criteria.

2-3.   (canceled)

4.   (previously presented) The invention of claim 1, wherein the one or more cost criteria are a function of at least one of sharing degree, administrative weight, link utilization, and available capacity.

5.   (canceled)

6.   (previously presented)   The invention of claim 1, wherein, when the path plan satisfies the failure-related cross-connection criterion, steps (b)-(d) are repeated with a constraint that excludes each and every saved path plan.

7.   (original)   The invention of claim 6, wherein steps (b)-(d) are repeated only until the path plan fails the failure-related cross-connection criterion.

8.   (previously presented)   The invention of claim 1, wherein, when the path plan fails the failure-related cross-connection criterion, steps (a)-(d) are repeated with a constraint that excludes each set of node-disjoint paths.

9.   (previously presented)   The invention of claim 8, wherein, when calculating a set of node-disjoint path pairs for the one or more demands per step (a) fails to find a feasible solution, the failure-related cross-connection criterion is relaxed and steps (a)-(e) are repeated using the relaxed failure-related cross-connection criterion.

10.   (previously presented)   A path manager for a mesh communications network, the manager comprising one or more computing elements, wherein the manager is adapted to:

   receive one or more demands for service in the mesh network, which network comprises a plurality of nodes interconnected by a plurality of links; and

   map each of the one or more demands onto a primary path and a restoration path in the network to generate at least one path plan for the one or more demands in the network, wherein the at least one path plan is generated as a function of (i) one or more cost criteria associated with the at least one path plan and (ii) a failure-related cross-connection criterion associated with the path plan by:

   (a)   calculating a set of node-disjoint path pairs for the one or more demands based on the failure-related cross-connection criterion, wherein a node-disjoint path pair is calculated for each demand;

   (b)   identifying primary and restoration paths for each node-disjoint path pair in the set to generate a path plan for the one or more demands;

15   (c)   determining whether the path plan satisfies the failure-related cross-connection
16   criterion;

17   (d)   saving, when the path plan satisfies the failure-related cross-connection criterion, the
18   path plan;

19   (e)   repeating steps (a)-(d) to generate two or more path plans that satisfy the
20   failure-related cross-connection criterion; and

21   (f)   selecting one of the path plans based on the one or more cost criteria.

1   11-12. (canceled)

1   13.   (previously presented) The invention of claim 10, wherein the one or more cost
2   criteria are a function of at least one of sharing degree, administrative weight, link utilization, and
3   available capacity.

1   14.   (canceled)

1   15.   (previously presented) The invention of claim 10, wherein, when the path plan
2   satisfies the failure-related cross-connection criterion, steps (b)-(d) are repeated with a constraint
3   that excludes each and every saved path plan.

1   16.   (original) The invention of claim 15, wherein steps (b)-(d) are repeated only until the
2   path plan fails the failure-related cross-connection criterion.

1   17.   (previously presented) The invention of claim 10, wherein, when the path plan fails
2   the failure-related cross-connection criterion, steps (a)-(d) are repeated with a constraint that
3   excludes each set of node-disjoint paths.

1   18.   (previously presented) The invention of claim 17, wherein, when calculating a set
2   of node-disjoint path pairs for the one or more demands per step (a) fails to find a feasible solution,
3   the failure-related cross-connection criterion is relaxed and steps (a)-(e) are repeated using the
4   relaxed failure-related cross-connection criterion.

1   19.   (previously presented) The invention of claim 10, wherein the failure-related

2   cross-connection criterion specifies a maximum number of cross-connections that are changed in

3   any node in the network following a failure in the network, wherein a path plan does not satisfy the

4   failure-related cross-connection criterion if the number of failure-related cross-connections that are

5   changed in any node in the path plan following a failure in the network exceeds the specified

6   maximum number.

1   20.   (previously presented) The invention of claim 1, wherein the failure-related

2   cross-connection criterion specifies a maximum number of cross-connections that are changed in

3   any node in the network following a failure in the network, wherein a path plan does not satisfy the

4   failure-related cross-connection criterion if the number of failure-related cross-connections that are

5   changed in any node in the path plan following a failure in the network exceeds the specified

6   maximum number.

1   21.   (currently amended) A <u>path-manager-implemented</u> method, comprising:

2   <u>the path manager</u> receiving one or more demands for service in a mesh network, which

3   network comprises a plurality of nodes interconnected by a plurality of links; and

4   <u>the path manager</u> mapping each of the one or more demands onto a primary path and a

5   restoration path in the network to generate at least one path plan for the one or more demands in the

6   network, wherein the at least one path plan is generated as a function of (a) one or more cost criteria

7   associated with the at least one path plan and (b) a failure-related cross-connection criterion

8   associated with the path plan by:

9   calculating a first set of one or more path plans that satisfy the one or more cost

10   criteria;

11   calculating a second set of one or more path plans that satisfy the failure-related

12   cross-connection criterion;

13   determining whether the first and second sets have any path plans in common; and

14   if not, then, until the first and second sets have at least one path plan in common,

15   relaxing the one or more cost criteria and recalculating the first set.

1   22.   (previously presented) The invention of claim 21, wherein the failure-related

2   cross-connection criterion specifies a maximum number of cross-connections that are changed in

3   any node in the network following a failure in the network, wherein a path plan does not satisfy the

4   failure-related cross-connection criterion if the number of failure-related cross-connections that are

5   changed in any node in the path plan following a failure in the network exceeds the specified

6   maximum number.

1   23.   (previously presented) The invention of claim 21, wherein the one or more cost

2   criteria are a function of at least one of sharing degree, administrative weight, link utilization, and

3   available capacity.

1   24.   (previously presented) A path manager for a mesh communications network, the

2   manager comprising one or more computing elements, wherein the manager is adapted to:

3   receive one or more demands for service in the mesh network, which network comprises a

4   plurality of nodes interconnected by a plurality of links; and

5   map each of the one or more demands onto a primary path and a restoration path in the

6   network to generate at least one path plan for the one or more demands in the network, wherein the

7   at least one path plan is generated as a function of (a) one or more cost criteria associated with the

8   at least one path plan and (b) a failure-related cross-connection criterion associated with the path

9   plan by:

10   calculating a first set of one or more path plans that satisfy the one or more cost

11   criteria;

12   calculating a second set of one or more path plans that satisfy the failure-related

13   cross-connection criterion;

14   determining whether the first and second sets have any path plans in common; and

15   if not, then, until the first and second sets have at least one path plan in common,

16   relaxing the one or more cost criteria and recalculating the first set.

1   25.   (previously presented) The invention of claim 24, wherein the failure-related

2   cross-connection criterion specifies a maximum number of cross-connections that are changed in

3   any node in the network following a failure in the network, wherein a path plan does not satisfy the

4   failure-related cross-connection criterion if the number of failure-related cross-connections that are

5   changed in any node in the path plan following a failure in the network exceeds the specified

6   maximum number.

1   26.   (previously presented) The invention of claim 24, wherein the one or more cost

2   criteria are a function of at least one of sharing degree, administrative weight, link utilization, and

3   available capacity.